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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/593,275	06/13/2000	Upendra V. Chaudhari	YOR-2000-0168US1	7772
35195	7590	08/25/2005	EXAMINER	
FERENCE & ASSOCIATES 409 BROAD STREET PITTSBURGH, PA 15143			HAN, QI	
			ART UNIT	PAPER NUMBER
			2654	
DATE MAILED: 08/25/2005				

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/593,275	CHAUDHARI ET AL.	
	Examiner	Art Unit	
	Qi Han	2654	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 June 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-27 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3, 6-16 and 19-27 is/are rejected.
- 7) ☒ Claim(s) 4-5, 17-18 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

Art Unit: 2654

DETAILED ACTION

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Response to Amendment

2. This communication is responsive to the applicant's amendment dated 06/16/2005.
3. The examiner withdraws the disclosure objection regarding equation (1), because the applicant amended the equation.
4. The examiner withdraws the objection regarding claims 13 and 16 as being dependent upon a rejected base claim (see the section of allowable subject matter in the previous office action), because the indefinite limitation in the related claims rejected under 35 USC 112 2nd is not resolved.

Response to Arguments

Applicant's arguments with respect to claims 1-27 (see the amendment: pages 12-16), have been fully considered but they are not persuasive.

In response to applicant's arguments regarding rejection of claims 13 and 26, under 35 USC 112 2nd, that "applicant ...assert the claims are not indefinite as C (a variable in the claimed equation) is understood by one of ordinary skill in the art" (page 12, paragraph 3), the examiner respectfully disagrees with the applicant, because 1) only assertion is not sufficient evidence for

Art Unit: 2654

overcoming the rejection; 2) leaving a variable indefinite in a claim leads to the whole equation in the claim to be indefinite. This may also cause lack of enablement, since an indefinite equation may not enable one of ordinary skill in the art to understand how to use the indefinite equation for solving a problem, without undue experimentation.

In response to applicant's arguments regarding claim rejection (for claims 1-3, 6-12, 14-16, 19-25 and 27) under 35 USC 103(a) (pages 12-16), that "there is ...no teaching or suggestion that the models used in calculating the various log likelihood scores having multiple levels of detail or that scores are calculated for each level of detail" (page 14, paragraph 1) and "actually combining the teachings of Goldenthal and Newman would not result in" the claimed "...capable of having a plurality of phonetic detail of varying resolution for **each frame**" and "determining, for each frame and each level of phonetic detail of the target speaker model, a likelihood value;..."(page 15, paragraph 3), the examiner respectfully disagrees with the applicant and has a different view of the prior art teachings and the claim interpretation. As stated in the previous office action (see section of Response to Arguments), it has been pointed out that the specification might disclose a different recognition approach from the references, but the applicant fails to distinguish the difference(s) between the prior art teachings and the broadest reasonable interpretation of the claimed limitations. In this case, the combined prior art disclosure teaches all claimed limitations based on a broadest reasonable interpretation of the claim (see detail in the claim rejection). Particularly, it is noted that the argued limitations "capable of having...for each frame" and "determining, for each frame and each level of phonetic detail of the target speaker model, a likelihood value" are clearly disclosed by the combined references (see Goldenthal: col. 1, line 47 to col. 2, line 31, 'likelihood that observed

Art Unit: 2654

frames'; and Newman: Figs. 3-7, col. 6, lines 30-33 and col. 7, lines 1-27, 'each word is represented by a set of phonemes', 'each phonemes is represented by the three set of model parameters that correspond to the three nodes of the parameter', 'a score for each frame' (reflecting a likelihood value), also see detail in the claim rejection).

In response to applicant's argument that there is no motivation or suggestion to combine the references (page 15, paragraph 3), the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, the obviousness is based on both prior art teachings and the common knowledge in the art. It is noted that the both cited references are in the same field of endeavor, using the similar approaches with log likelihood score and statistical model in the processing, and to solve same or similar problem of speaker identification and/or verification. Also, it is noted that increasing efficiency and quality of a (speaker) recognition system is a common goal and/or well-known knowledge in the art. Therefore, the examiner believes the obviousness of combining the references based on the above motioned prior art teachings and the common knowledge in the art is properly addressed.

For the above reason, the rejection is sustained.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

Art Unit: 2654

6. Claims 13 and 26 rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claims 13 and 16, the variable C is not defined in the claim, which leads the claim to be indefinite.

Claim Rejections - 35 USC § 103

7. Claims 1-3, 6-12, 14-16, 19-25 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Goldenthal et al. (US 6,205,424) hereinafter referenced as Goldenthal, in view of Newman et al. (US 5,946,654) hereinafter referenced as Newman.

Regarding **claim 1**, Goldenthal discloses two-staged cohort selection for speaker verification system (title), comprising:

“providing a model corresponding to a target speaker, the model being resolved into at least one frame”, (column 3, line 64 to column 4, line 29, 'the frames...processed by a model generator to produce sets of acoustic models which characterize the original speech signals', 'one set of acoustic models for every identified speaker (target speaker) desiring enrollment');

“receiving an identity claim”, (column 1, lines 47-49, 'the claimed identity of an individual can be verified by having the individual utter a prompted sequence of words or spontaneous speech during a testing session');

“ascertaining whether the identity claim corresponds to the target speaker model”, (column 1, lines 56-57, 'if the score exceed a predetermined threshold its presumed that the individual is who he or she claims to be');

“said ascertaining step comprising the steps of: determining, for each frame [and each level] of phonetic detail of the target speaker model, a likelihood value; and resolving the at least one likelihood value to obtain a likelihood score”, (column 1, lines 50-57, 'these validation or testing speech signals are analyzed and compared with the pre-stored observation models corresponding to the "claimed" identity to determine scores', 'the scores can be expressed as log likelihood scores: $\text{score} = \log p(O/I)$, where p represents the likelihood that the observed frames O were produced by the individual I).

But, Goldenthal fails to expressly disclose “capable of having a plurality of levels of phonetic detail of varying resolution for each frame” and determining a likelihood value for “each level” of the phonetic detail of target speaker model. However, these features are well known in the art as evidenced by Newman who, in the same field of endeavor, discloses speaker identification using unsupervised speech models (title), comprising that that 'each word 700 (Fig. 7) is represented by a set of phonemes 705 that represent the phonetic spelling of the word', and 'each phoneme is represented by three sets of model parameters 710 that correspond to the three nodes of the phoneme' (column 6, lines 29-34), which suggests that the system includes multiple levels of phonetic detail and the corresponding processing for each level, as claimed. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Goldenthal by specifically providing multiple phonetic detail levels and the corresponding processing, as taught by Newman, for the purpose of increasing efficiency and quality of a recognition system.

Regarding **claim 2** (depending on claim 1), Goldenthal in view of Newman further discloses “for each frame and each level of phonetic detail likelihood value is a maximum

Art Unit: 2654

likelihood value” (Goldenthal: column 1, lines 53-54, 'the a log likelihood score'; column 2, lines 21-31, the log likelihood 'function f can be statistical ... maximum').

Regarding **claim 3** (depending on claim 2), Goldenthal in view of Newman further discloses “said step of resolving the at least one likelihood value comprises averaging the at least one likelihood value”, (Goldenthal: column 1, lines 53-54, 'the a log likelihood score'; column 2, lines 21-31, the log likelihood 'function f can be statistical ... average').

Regarding **claim 6** (depending on claim 1), Goldenthal in view of Newman further discloses “the at least one level of phonetic detail comprises at least one of the following: a global level; a phonemic level and a subphonemic level”, (Goldenthal: column 4, lines 8-29, 'a segment based speech approach to speech processing' and 'that designated segment can be units of speech, for example, phones, or transition from one phone to another').

Regarding **claim 7** (depending on claim 6), as stated above (see claim 1), Goldenthal in view of Newman discloses “the at least one level of phonetic detail comprises all of the following three levels: a global level; a phonemic level and a sub-phonemic level” (Newman: column 6, lines 29-34, 'each word 700 (Fig. 7) is represented by a set of phonemes 705 that represent the phonetic spelling of the word, and each phoneme is represented by three sets of model parameters 710 that correspond to the three nodes of the phoneme', which reads on the claim).

Regarding **claim 8** (depending on claim 7), Goldenthal fails to expressly disclose “providing labeling information for each frame.” However, the feature is well known in the art as evidenced by Newman who further discloses the labeling information in Figs 5-6 and 8. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention

Art Unit: 2654

was made to modify Goldenthal by specifically providing labeling information for each frame, as taught by Newman, for the purpose of increasing efficiency of a recognition system.

Regarding **claim 9** (depending on claim 1), Goldenthal in view of Newman further discloses “accepting or rejecting the identity claim”, (Goldenthal: column 1, lines 50-57, 'if the scores exceed a predetermined threshold, it is presumed that the individual is who he or she claims to be'; Newman: column 2, line 44, 'Bayesian adaptation approach'; which necessarily includes accepting or rejecting the identity claim).

Regarding **claim 10** (depending on claim 1), as stated above, Goldenthal in view of Newman discloses “comparing a quantity based on the likelihood score to a predetermined threshold value”, (Goldenthal: column 1, lines 50-57, 'if the scores exceed a predetermined threshold, it is presumed that the individual is who he or she claims to be').

Regarding **claim 11**(depending on claim 10), Goldenthal in view of Newman further discloses “the steps of providing at least one model corresponding to at least one background speaker; and determining the quantity based on the likelihood score via employing the at least one background speaker model”, (Goldenthal: column 4, lines 49-58, 'a plurality of sets of "cohort" models (CM) 170 (Fig. 1) which characterize the speech signals of each identified speaker, are selected from the available sets of acoustic models of the other speakers', 'the selection can be made according to predetermined selection criteria, for example, the models which best characterize the speech of the identified speaker, or the models whose characterization fits some predetermined probability density function', which suggests that the combined system has capability of implementing the functionality as claimed).

Art Unit: 2654

Regarding **claim 12**, (depending on claim 11), Goldenthal in view of Newman further discloses "said step of determining the quantity based on the likelihood comprises determining a log-likelihood ratio based on the likelihood score", (Goldenthal: column 2, lines 21-28, 'that during testing, the score obtained from the models of the speaker whose identity is claimed is compared with all of the scores derived from the small set of cohort models to produce a set of score differences, and the differences are then used as a normalized score = $\log p(O/I) - f[\log p(O/(C_k(I))]$, where $\log p(O/(C_k(I))$ are the scores for the k cohorts linked to the claimed individual').

Regarding **claims 14-16 and 19-25**, they recite an apparatus. The rejection is based on the same reason described for claims 1-3 and 6-12, respectively, because claims 14-16 and 19-25 recite same or similar limitation(s) as claims 1-3 and 6-12, respectively.

Regarding **claim 27**, it discloses a program storage device readable by machine, which corresponds to the method of claim 1. The rejection is based on the same reason described for claim 1 because the claim recites same or similar limitation(s) as claim 1.

Allowable Subject Matter

8. Claims 4-5 and 17-18 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The statement for the allowable subject matter is based on the same reason as described in the previous office action (filed on 03/16/2005).

Art Unit: 2654

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

4. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

5. Any response to this action should be mailed to:
Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450
or faxed to:
(703) 872-9306, (for formal communications intended for entry)
Or:
(703) 872-9306, (for informal or draft communications, and please label
"PROPOSED" or "DRAFT")

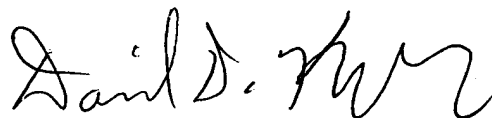
Patent Correspondence delivered by hand or delivery services, other than the USPS, should be addressed as follows and brought to U.S. Patent and Trademark Office, 220 20th Street S., Customer Window, Crystal Plaza Two, Lobby, Room 1B03, Arlington, VA, 22202

Art Unit: 2654

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Qi Han whose telephone numbers is (703) 305-5631. The examiner can normally be reached on Monday through Thursday from 9:00 a.m. to 7:00 p.m. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richemond Dorvil, can be reached on (703) 305-6954.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Inquiries regarding the status of submissions relating to an application or questions on the Private PAIR system should be directed to the Electronic Business Center (EBC) at 866-217-9197 (toll-free) or 703-305-3028 between the hours of 6 a.m. and midnight Monday through Friday EST, or by e-mail at: ebc@uspto.gov. For general information about the PAIR system, see <http://pair-direct.uspto.gov>.

QH/qh
August 22, 2005

A handwritten signature in black ink, appearing to read "David D. Knepper", with a stylized, cursive script.

DAVID D. KNEPPER
PRIMARY EXAMINER